

# Anticancer Properties of Garlic Gain New Support

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## STORY AT-A-GLANCE

- › A study published in *Biomedicine and Pharmacotherapy* highlights garlic's novel phytochemicals and how they can help protect against cancer
- › When tumor cells spread in your body, cancer becomes more challenging to treat. Through its compounds, garlic can help block signaling pathways that are needed in cell migration and prevent the spread of tumor cells
- › Another study reveals that garlic can help prevent cancer from relapsing by targeting cancer stem cells (CSCs). These are the cells found within a tumor that can self-renew and turn into more cancer cells
- › The best way to enjoy fresh garlic is to eat it raw – you'll need to crush or chop the cloves to promote the formation of allicin. Simply compress the clove with a spoon or chop it finely before swallowing

Loved by many for the distinct flavor and aroma it gives to food, garlic is one the most celebrated herbs around the world. It holds a significant place in history, and ancient civilizations valued it for its culinary and medicinal uses. Case in point – garlic was a part of the Ancient Greeks' military diet, and soldiers were often given garlic before they were sent off to battle.<sup>1</sup>

Research has demonstrated garlic's health-boosting benefits due to its antimicrobial, anti-inflammatory, antithrombotic and antioxidant activities, to name a few. Studies<sup>2,3,4</sup> also support the notion that this humble herb has anticancer effects, which should be good enough reason for you to include more of it in your diet.

## **Garlic Contains Potent Anticancer Phytochemicals**

A study published in *Biomedicine and Pharmacotherapy*<sup>5</sup> highlights how garlic's novel phytochemicals can help protect against cancer. According to the authors:

*"Cancer researchers have identified that many of the phytochemicals of garlic have anticancer effects. Recently, we found that some components of garlic have novel therapeutic anticancer properties.*

*This review will discuss the anticancer mechanisms of garlic phytochemicals, showing their potential for cancer treatment in compared to conventional chemoprevention agents."*

The researchers noted that the organosulfur compounds (OSCs) in garlic are responsible for its health benefits. These OSCs can be divided into two kinds: oil-soluble compounds and water-soluble compounds.

Alliin, allicin and ajoene are the oil-soluble organosulfur compounds in garlic; allicin is the primary sulfur compound and gives this food its pungent aroma. When garlic is crushed or chopped, it releases a compound called alliinase, which then converts alliin to allicin.

The researchers note that the water-soluble organosulfur compounds – namely S-allylcysteine (SAC) and S-allylmercaptocysteine (SAMC), metabolites allyl mercaptan (AM) and allyl methyl sulfide (AMS) – are the ones that give garlic its anticancer properties, even though they just make up a small portion of garlic's compounds.

*"SAC is an odorless, stable, water-soluble compound with antioxidant and cholesterol-lowering effects in clinical studies ... Previous results have shown that SAC acts as an effective agent against the malignant progression of human non-small cell lung carcinoma in both in vitro and in vivo model," the researchers note.*<sup>6</sup>

## **Studies Highlight Garlic's Mechanisms of Action Against Cancer**

Garlic's biological effects against cancer have been demonstrated in animal and human studies, and the researchers note that they have certain actions on the various stages of cancer:<sup>7</sup>

*"In the initiation stage, blocking phytochemicals prevents the bioactivation of carcinogens through antioxidation, antimutagenesis and detoxication. In the promotion stage, suppressing phytochemicals inhibits the proliferation of clonal cells by modulating protein folding and DNA repair.*

*In the progression stage, suppressing phytochemicals impedes the growth or metastasis of tumors by changing the cell behaviors, including antiproliferation, apoptosis and immunocompetence."*

To make it easier to understand, here's a summary of what garlic does to help prevent cancer proliferation and progression in your system:<sup>8</sup>

- **Suppressing mutagenesis** or preventing DNA mutations that can heighten cancer risk.
- **Scavenging free radicals** that damage healthy cells.
- **Regulating enzyme activities**, which are essential to your body functions.
- **Inhibiting protein folding in the endoplasmic reticulum**, which is part of your cells.
- **Influencing cancer cell behavior**, namely preventing the cells from growing rapidly, making them more susceptible to apoptosis (cancer cell death) and allowing them to be easily detected by your immune system.

The researchers explained that when tumor cells spread in your body, cancer becomes more challenging to treat. Through its compounds, garlic can help block signaling pathways that are needed in cell migration and prevent the spread of tumor cells.

*"We thought that garlic components not only have functions in the stages of cancer chemoprevention but also have uncovered potency for cancer therapy," they said.<sup>9</sup>*

## Garlic Helps Inhibit Relapse by Targeting Cancer Stem Cells

Another study published in the International Journal of Herbal Medicine<sup>10</sup> also reveals that garlic can help prevent cancer from relapsing by targeting cancer stem cells (CSCs). These are the cells found within a tumor that can self-renew and turn into more cancer cells.

Conventional cancer treatments like chemotherapy cannot eliminate these stem cells; even if the tumor is removed, but these CSCs are left behind, they can metastasize and spread.

The researchers conducted in-vitro testing using three different types of garlic extract on different types of cancer cells, including breast, colon, prostate, colon, hepatic and cervical cancers. The extracts were made from fresh garlic cloves, and all showed anticancer potential, although the third extract (G3), made from an evaporated mixture of fresh cloves and ethanol, showed the greatest anticancer activity. According to the study authors:<sup>11</sup>

*"Chemotherapeutic drugs end up killing cancer cells sparing CSCs which after a while can give rise to a full-blown tumor with high metastatic potential. These drugs mainly involve the use of synthetic compounds.*

*Thus the need of the hour is to have a natural agent which can possess both anticancer and anticancer stem cell activity and additionally should have no or minimal effect on normal cell population."*

A review of studies published in the journal Frontiers in Pharmacology<sup>12</sup> not only echoes these findings but also further explains how garlic protects against the harsh side effects of conventional cancer treatments. The researchers noted that garlic may help protect the liver against arsenic trioxide, a medicine used in leukemia patients, and tamoxifen, a medicine used by breast cancer patients.

## What Else Can Garlic Do for Your Health?

Garlic belongs to the allium plant family, along with leeks, onions and chives.<sup>13</sup> In addition to allicin and other sulfur compounds and metabolites, this herb is also rich in bioactive compounds like organic sulfides, saponins, phenolics and polysaccharides. It contains high levels of phosphorus, potassium and zinc as well.<sup>14</sup>

Even Hippocrates, the father of medicine, acknowledged the value of garlic for human health, and prescribed it as a cleansing agent, as well as for treatment against abdominal and uterine growths and uterine problems.<sup>15</sup>

Indeed, adding more garlic to your diet can provide you with myriad benefits – you can read my article "[9 Health Benefits of Garlic](#)" for an in-depth review, but here's a summary of what this herb can do for you, aside from helping protect against cancer:

**Inhibiting the growth of fungi and bacteria** – Allicin works as a fungicidal and may help eliminate yeasts and fungi like *Cryptococcus trichophyton*, *Candida albicans*, *Histoplasma capsulatum* and *Cryptococcus neoformans*.<sup>16</sup>

Its antibacterial properties may be beneficial against gram-positive and gram-negative bacteria like *Staphylococcus*, *Enterobacter*, *Shigella* and *Klebsiella* strains, to name a few.<sup>17</sup>

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**Lowering your risk of metabolic syndrome** – A 2018 study<sup>18</sup> said that eating at least 100 milligrams of raw, crushed garlic twice a day for four weeks can help reduce metabolic syndrome, which include high blood pressure, triglyceride levels and fasting blood glucose.

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**Bolstering immunity** – A study<sup>19</sup> found that aged garlic extract can reduce reactive oxygen species (ROS), which helps prevent endothelial dysfunction, a sign of early atherosclerosis.

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**Minimizing inflammation** – Aged garlic provides compounds that modulate cytokine production, which is involved in immune system and inflammatory responses.<sup>20</sup>

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**Promoting cardiovascular health** – Its properties may act synergistically to protect against heart-related events like heart attack. According to a review published in *Antioxidants*:<sup>21</sup>

*"Based on current research, garlic can significantly reduce the risk of atherosclerosis, hypertension, diabetes, hyperlipidemia, myocardial infarction, and ischemic stroke, thanks to the synergistic effects of its nutritional and phytochemical components."*

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**Antidiabetic effects** – A study<sup>22</sup> found that consuming an herbal preparation that includes garlic reduced fasting glucose levels. The study participants were given a dose of 750 milligrams herbal preparation three times a day for 12 weeks.

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**Supporting bone and skin health** – Garlic may help ease symptoms of knee osteoarthritis and reduce the risk of osteoporosis in postmenopausal women.<sup>23</sup> It can also benefit warts, denture stomatitis and venous ulcers.<sup>24</sup> During World War II, soldiers applied garlic to their wounds as a first-aid remedy to prevent infections.<sup>25</sup>

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## Have You Tried Black Garlic?

The best way to enjoy fresh garlic is to eat it raw – you'll need to crush or chop the cloves to promote the formation of allicin. Simply compress the clove with a spoon or just chop it finely before swallowing.

Not everyone, though, enjoys the strong flavor of garlic, and some find the aroma a bit off-putting, especially when it remains on your breath. You can eliminate "garlic breath" by chewing mint leaves, lettuce or a few slices of raw apple.<sup>26</sup>

If you're really not fond of it, consider trying aged **black garlic** – this is made by fermenting the whole bulbs of fresh garlic in climate-controlled conditions for several weeks. A study in the journal *molecules* describes it to have a "sweet and sour taste and

no strong odor."<sup>27</sup> Even those who are averse to fresh garlic may end up liking this product.

## **Aged Black Garlic May Help Protect Your Brain Health**

An animal study published in the journal *Nutrients*<sup>28</sup> found that aged garlic extract (AGE) may help improve short-term recognition memory and ease neuroinflammation associated with Alzheimer's disease. According to the researchers:

*"Pretreatment of AGE alleviated the recognition memory impairment involving short-term memory in A $\beta$  (1-42)-induced rats by decrease the density of CD11b-positive microglia immunoreactivity and the density of IL-1 $\beta$  in the injured brain. Therefore, it is suggested that AGE could be a good supplementary food for the improvement of cognitive function in the elderly and AD patients."*

They identified the SAC compound as one of the major contributors to aged garlic's brain-boosting effects, and this compound is found in greater quantities in aged garlic and black garlic compared to fresh garlic. The study authors also noted the other ways that aged garlic may protect the brain, which include:<sup>29</sup>

- Protecting against neurodegenerative conditions
- Preventing brain injury following ischemia
- Protecting neuronal cells against apoptosis
- Preventing  $\beta$ -amyloid-induced oxidative death

## **To Truly Lower Your Cancer Risk, You Need to Address This First**

Please remember that reducing your risk of getting cancer doesn't simply depend on one nutrient. Even if you zealously consume garlic or use black garlic extract, you can still fall victim to this disease if you fail to address your cellular health.

Virtually all major diseases like cancer, heart disease and obesity are linked to an inability to produce cellular energy due to impaired mitochondrial function. Without sufficient cellular energy, your body will not be able to fuel the innate repair and regeneration processes that are essential to disease prevention and recovery.

There are many factors that can compromise the integrity and functionality of your cells, but I believe there are four top culprits that can severely impact your mitochondrial energy production – excessive [linoleic acid consumption](#), having high estrogen levels, endotoxin production, and chronic exposure to electromagnetic frequencies (EMFs) and 5G technology.

I believe that addressing these four factors will help repair your mitochondrial function and optimize your cellular energy production, and is the crucial first step toward warding off chronic diseases, not just cancer but virtually all chronic diseases plaguing the world today. My new book, which will be out this summer, will go into more details about these culprits and the best strategies to improve your cellular energy, so stay tuned.

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